



DC FAN LIFE EXPERIMENT REPORT

Available for these models with lower speed and same physical structure. All model may be followed by Rxx or Fxx series suffixes. This test report applies to NB 60X60X12mm series as the right table	KFB0612HAFDB			
Representative Test P/N :NB8CB00-15K11		(I:4020323800 F:4020303718)		
Equipment: 1.Oven: E24-W520				

© **L₁₀ Expectancy:** **3,572** hours minimum @ fan rated voltage and the temperature of 70°C

According to the equation for **Weibull distribution**, **MTTF ≐ 7×L10 = 25,004 hours**

And we rely on a zero failure Weibull test strategy and accelerated testing technique, to determine the total test time (t) for verifying the above life estimation by the equations,

$$t = 1.036 \times \text{MTTF} \times [(B_{r,c}) \div n]^{0.91} \div A_F, \text{ and } A_F = 2^{(T_s - T_u)/10}$$

where, (B_{r,c}) is Poisson distribution factor with the failure number of r equal to 0 and the decimal confidence level of c equal to 0.90(90%), and

Stress/Elevated Temperature Ts (°C) (Actual Test Temperature)	Unstress Temperature Tu (°C)	Acceleration Factor AF	Quantity of Test Devices n (pcs)	Poisson Distribution Factor Br;c	Required test time with zero failure t (hours)	Actual test time with zero failure t (hours)	Verified MTTF 70°C (hours)	Verified L ₁₀ 70 °C (hours)
70	70	1.00	56	2.303	1,420	6,450.0	113,596	16,228

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2016/7/7 10:00 AM	2016/9/10 5:43 PM	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	6450.0

Herewith, we could assume as right on the basis of above test result. Besides, if the actual test time exceed the required, it comes out that those fans' L10 expectancy and MTTF are greater than the warrant. (MTTF: means Mean Time To Failures, it should be used in a non-repairable system setting. Now we show the MTTF in our life report, that's because we will not repair the failed fans during life experiment. MTBF: means Mean Time Between failures, it should be used in a repairable system setting.)

Temperature for MTTF Estimation (°C)	Acceleration Factor A _F	Estimated MTTF (hours)	Estimated L ₁₀ (hours)
25	22.63	2,570,387	367,198
30	16.00	1,817,538	259,648
40	8.00	908,769	129,824
50	4.00	454,385	64,912
60	2.00	227,192	32,456
70	1.00	113,596	16,228

Fan permission criteria for the measurement after test :

1. Speed can not drop of ≥ 15% below the original measured rpm.
2. Current cannot increase > 15% of original measure current.
3. Noise cannot >3dB over the original measure noise.

Test Result	<input checked="" type="checkbox"/> Accept
	<input type="checkbox"/> Reject

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
WJQEFML-2016142VD	148.00	2017/4/8 8:00 AM	YALI.QIU	TAOE.LIANG

BGN(dBA) : 18.0

Temp(°C) : 22.3

P(cmHg) : 76.4



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination (at least)	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
1,420	2016/7/7 10:00 AM	2016/9/10 5:43 PM	56	0	6450.0

Representative Test P/N :NB8CB00-15K11	Current Test Status	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination
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Equipment: 1.Oven: E24-W520

Test Data Between Initial Test and Final Test

Sample No.	Initial Test	Final Test	Deviation (%)	Initial Test	Final Test	Deviation (%)	Initial Test	Final Test	Deviation
	Current Spec. (mA)	Current Spec. (mA)		Speed Spec. (RPM)	Speed Spec. (RPM)		Noise Spec. (dB A)	Noise Check. (dB A)	
	180MAX.	180MAX.	15% MAX.	3300REF	3300REF	15% MAX.	40.7MAX.	40.7MAX.	3 dB MAX.
1	130	136	4.6	3572	3476	-2.7	32.8	33.5	0.7
2	133	132	-0.8	3487	3464	-0.7	34.0	34.6	0.6
3	128	129	0.8	3514	3595	2.3	33.1	33.5	0.4
4	134	131	-2.2	3563	3502	-1.7	33.4	34.1	0.7
5	135	128	-5.2	3467	3630	4.7	33.5	34.6	1.1
6	133	134	0.8	3468	3364	-3.0	33.7	34.1	0.4
7	136	133	-2.2	3449	3386	-1.8	33.8	33.5	-0.3
8	140	151	7.9	3441	3475	1.0	33.9	33.7	-0.2
9	131	134	2.3	3580	3454	-3.5	33.4	33.4	0.0
10	138	133	-3.6	3478	3387	-2.6	33.7	33.6	-0.1
11	133	134	0.8	3586	3491	-2.6	33.5	34.5	1.0
12	134	135	0.7	3466	3387	-2.3	34.1	34.2	0.1
13	129	134	3.9	3580	3414	-4.6	34.2	34.8	0.6
14	133	134	0.8	3477	3410	-1.9	34.7	34.1	-0.6
15	134	138	3.0	3545	3378	-4.7	33.7	34.3	0.6
16	130	132	1.5	3548	3358	-5.4	33.6	34.6	1.0
17	132	138	4.5	3555	3358	-5.5	33.8	33.5	-0.3
18	135	134	-0.7	3506	3407	-2.8	33.9	34.5	0.6
19	135	138	2.2	3552	3356	-5.5	34.1	34.1	0.0
20	132	137	3.8	3566	3345	-6.2	34.7	34.3	-0.4
21	132	136	3.0	3505	3367	-3.9	34.8	33.6	-1.2
22	128	137	7.0	3549	3365	-5.2	34.7	34.7	0.0
23	132	135	2.3	3524	3374	-4.3	33.1	34.2	1.1
24	134	135	0.7	3501	3400	-2.9	33.6	33.6	0.0
25	130	136	4.6	3526	3389	-3.9	33.7	33.8	0.1
26	129	133	3.1	3539	3414	-3.5	33.8	33.4	-0.4
27	132	133	0.8	3600	3352	-6.9	33.9	33.2	-0.7
28	141	135	-4.3	3444	3391	-1.5	34.2	34.7	0.5
29	134	136	1.5	3558	3400	-4.4	34.1	34.2	0.1
30	136	140	2.9	3539	3383	-4.4	34.7	33.8	-0.9
31	135	136	0.7	3529	3373	-4.4	34.1	33.1	-1.0
32	137	137	0.0	3548	3372	-5.0	33.1	33.6	0.5



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Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination (at least)	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
1,420	2016/7/7 10:00 AM	2016/9/10 5:43 PM	56	0	6450.0

Representative Test P/N :NB8CB00-15K11	Current Test Status	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination
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Equipment: 1.Oven: E24-W520

Test Data Between Initial Test and Final Test

Sample No.	Initial Test	Final Test	Deviation (%)	Initial Test	Final Test	Deviation (%)	Initial Test	Final Test	Deviation
	Current Spec. (mA)	Current Spec. (mA)		Speed Spec. (RPM)	Speed Spec. (RPM)		Noise Spec. (dB A)	Noise Check. (dB A)	
	180MAX.	180MAX.	15% MAX.	3300REF	3300REF	15% MAX.	40.7MAX.	40.7MAX.	3 dB MAX.
33	130	135	3.8	3468	3415	-1.5	33.1	33.5	0.4
34	136	136	0.0	3569	3380	-5.3	33.2	34.6	1.4
35	127	134	5.5	3614	3399	-5.9	33.7	34.8	1.1
36	141	135	-4.3	3455	3357	-2.8	33.2	33.5	0.3
37	136	134	-1.5	3537	3370	-4.7	32.7	34.2	1.5
38	133	135	1.5	3475	3371	-3.0	33.7	34.7	1.0
39	132	136	3.0	3506	3378	-3.7	33.6	34.8	1.2
40	132	136	3.0	3501	3392	-3.1	33.7	33.5	-0.2
41	131	136	3.8	3507	3344	-4.6	33.8	33.6	-0.2
42	129	136	5.4	3628	3359	-7.4	33.6	33.1	-0.5
43	129	133	3.1	3608	3445	-4.5	33.7	34.8	1.1
44	131	135	3.1	3589	3394	-5.4	33.8	34.2	0.4
45	130	134	3.1	3563	3369	-5.4	33.9	33.5	-0.4
46	133	135	1.5	3534	3380	-4.4	33.7	34.3	0.6
47	131	135	3.1	3601	3373	-6.3	33.1	34.8	1.7
48	131	136	3.8	3604	3384	-6.1	33.7	33.2	-0.5
49	137	133	-2.9	3531	3331	-5.7	33.6	33.5	-0.1
50	136	135	-0.7	3468	3418	-1.4	33.7	34.2	0.5
51	132	136	3.0	3566	3400	-4.7	33.6	33.0	-0.6
52	133	134	0.8	3566	3404	-4.5	33.5	34.5	1.0
53	138	137	-0.7	3411	3387	-0.7	33.4	33.1	-0.3
54	132	135	2.3	3506	3432	-2.1	33.4	34.5	1.1
55	140	134	-4.3	3436	3376	-1.7	33.7	34.6	0.9
56	133	132	-0.8	3519	3343	-5.0	33.6	33.8	0.2
X-Bar	133.18	135.02	-	3527.21	3400.32	-	33.72	33.99	-
σ	3.292	3.012	-	51.791	55.721	-	0.453	0.551	-

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
WJQEFML-2016142VD	148.00	2017/4/8 8:00 AM	YALI.QIU	TAOE.LIANG